Starter:

1. How much energy should be provided from protein in a balanced diet? [1 mark]
2. List two functions of proteins in the human body [2 marks]
3. Define protein complementation [1 mark]
4. Identify two plant sources of high biological value protein [2 marks]

Starter- Question 5, write out and identify the correct information

Fill in the gaps using the keywords below. Note that some of the keywords may be incorrect. **(3 marks)**

carbohydrates	*low biological value*	*primary*	*fatty acids*
alternative	*amino acids*	*secondary*	*fats*
high biological value	*bean curd*	*tofu*	*proteins*

i) Proteins are built from (1)_____. There are 20 types, and if a protein contains them all, it is called a (2)_____ protein.

ii) Proteins are a (1)_____ source of energy. One gram of protein provides nearly the same amount of energy as one gram of (2)_____.

iii) Textured vegetable protein is also called (1)_____. It can be used as an (2)_____ to meat.

Revision- Macronutrients Protein

Learning Objectives:

Recall information about protein

Address any misconceptions

Apply knowledge to exam questions

Revisiting Protein

- Functions- growth and repair (tissues and cells), secondary energy sources, making hormones, enzymes and antibodies
- Sources-HBV- animal products (meat, fish, milk, yoghurt, cheese)- plants (soya beans- tofu etc, quinoa)

  LBV- cereals, peas, legumes, seeds

- Excess- harmful to kidneys and liver, can be stored as fat
- Deficiency- Kwashiorkor- children in developing countries, lack of essential amino acids.
- RDA- 50g men, 45g women

In depth look- Biological value

- Building blocks of life!
- Long chain molecules of amino acids
- 20 different amino acids.
- Non-essential amino acids= made by the body
- 8 Essential amino acids- need to be taken in, in diet.

- HBV- High biological value (contain 8 essential amino acids)
- LBV- Low biological value (DO NOT CONTAIN essential amino acids)

In depth look- Protein Complementation

- Combining two LBV proteins to ensure that there are enough HBV amino acids available.
- Examples:
  - Lentil dhal and chapatis
  - Rice and peas
  - Baked beans on toast
  - Hummous with pitta bread

- Protein complementation is needed to ensure that vegetarians get all the essential amino acids, it can save money because LBVs tend to be cheaper than HBV (LINK FOOD CHOICE)

In depth look- Protein Alternatives

- Soya
  - Edamame beans
  - TVP (Textured Vegetable Protein)
  - Tofu
  - Soya milk
  - Tempeh (cultured with mould to form a solid meat substitute)
  - Miso (fermented paste made from soya beans, rice/barley grains, salt and water)
- Mycoprotein (Quorn- fungus similarly grown to yeast in bread)
- Quinoa

Quorn™

Plenary- Exam question

Explain why protein deficiency may put a stop to growth in children. (4 marks)

Plan? What do you need to include?

P- Point

E- Evidence

E- Explain

L- Link

Mark Scheme

Any two reasons with a possible mechanism behind it; for example:

(1 mark for each reason and 1 mark for each correct explanation, max. 4 marks)

Lack of protein means that there is no building material to build new cells, so the body cannot grow or develop new tissues.

Lack of protein means that there is no material to repair old tissues, so the body will use whatever is available to rebuild damaged cells, at the cost of growth and development of new ones.

Lack of protein means that growth hormone cannot be built, so growth will be stopped by the lack of hormone.

Lack of protein means that the enzymes cannot be built, so the food will not be broken down properly and there will be no energy or building material to build new tissues.

Accept any other suitable answer.